

A new *Fusinus* (Gastropoda: Fasciolaridae) from Japan

Un nuevo *Fusinus* (Gastropoda: Fasciolaridae) de Japón

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ABSTRACT

Examination of the holotype of *Fusinus hyphalus* M. Smith, 1940 reveals that *F. hyphalus* is a subjective junior synonym of *F. graciliformis* (Sowerby, 1880). The species often called *F. hyphalus* and illustrated by authors is without a name. *Fusinus satsumaensis* spec. nov. [type locality: off Akune, Kagoshima Prefecture, Japan] is proposed as the name for this misidentified species in the subgenus *Chryseofusus* Hadorn and Fraussen, 2003 and compared with *F. (Chryseofusus) graciliformis* (Sowerby, 1880), *F. (C.) chrysodomoides* (Schepman, 1911), *F. (C.) jurgeni* Hadorn and Fraussen, 2002 and *F. (C.) westralis* Hadorn and Fraussen, 2003.

RESUMEN

El examen del holotipo de *Fusinus hyphalus* M. Smith, 1940 revela que *F. hyphalus* es un sinónimo juvenil de *F. graciliformis* (Sowerby, 1880). La especie a menudo denominada *F. hyphalus* e ilustrada por varios autores carece de nombre. Se propone el nombre de *Fusinus satsumaensis* spec. nov. para esta especie inidentificada, dentro del subgénero *Chryseofusus* Hadorn y Fraussen, 2003. Se compara con *F. (Chryseofusus) graciliformis* (Sowerby, 1880), *F. (C.) chrysodomoides* (Schepman, 1911), *F. (C.) jurgeni* Hadorn y Fraussen, 2002 y *F. (C.) westralis* Hadorn y Fraussen, 2003.

KEY WORDS: Mollusca, Gastropoda, Fasciolaridae, *Fusinus*, *Chryseofusus*, Japan, new species.

PALABRAS CLAVE: Mollusca, Gastropoda, Fasciolaridae, *Fusinus*, *Chryseofusus*, Japón, nueva especie.

INTRODUCTION

HADORN AND FRAUSSEN (2003) recently described the subgenus *Chryseofusus* in *Fusinus* to accommodate a number of species sharing conchological characteristics different from typical *Fusinus* and described new species in this subgenus. One of the treated species was *F. hyphalus* M. Smith, 1940. At that time of that paper the two authors were unable to locate the holotype of *F. hyphalus*.

We have since found the holotype in the Florida Museum of Natural History in Gainesville, USA. Examination of the holotype reveals that *F. hyphalus* is a juvenile specimen of *F. graciliformis*. Based on the original description and the poor figure of the holotype, HADORN AND FRAUSSEN (2003) failed to recognize this synonymy and confused it with the misidentified species often called *F. hyphalus* by authors and

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recorded from Japan, the East China Sea and the Philippine Islands.

Abbreviations used:

ANSP Academy of Natural Sciences, Philadelphia, USA.

BMNH The Natural History Museum, London, United Kingdom.

FLMNH/UF Florida Museum of Natural History, Gainesville, Florida, USA.

MC Collection of Mitsuo Chino, Kawasaki, Japan.

MNHN Muséum national d'Histoire naturelle, Paris, France.

NSMT National Science Museum, Tokyo, Japan.

RH Collection of Roland Hadorn, Lyss, Switzerland.

RMNH National Museum of Natural History – Naturalis, Leiden, the Netherlands.

WAM Western Australian Museum, Perth, Australia.

ZMA Zoologisch Museum, University of Amsterdam, Amsterdam, the Netherlands.

dd dead collected specimen.

juv juvenile specimen.

lv live collected specimen.

subad subadult specimen.

SYSTEMATICS

Family FASCIOLARIIDAE Gray, 1853 Genus *Fusinus* Rafinesque, 1815

Fusinus Rafinesque, 1815. Anal. nat. tabl. univ. corps org.: 145. Substitute name for '*Fusus* Lamarck' [= *Fusus* Bruguière, 1789], non *Fusus* Helbling, 1779.

Type species: *Murex colus* Linnaeus, 1758, by typification of replaced name.

Subgenus *Chryseofusus* Hadorn and Fraussen, 2003

Chryseofusus Hadorn and Fraussen, 2003. The deep-water Indo-Pacific radiation of *Fusinus*. *Iberus*, 21 (1): 207-240.

Type species: *Fusus chrysodomoides* Schepman, 1911.

Fusinus (Chryseofusus) satsumaensis spec. nov. (Figs. 1-8)

Fusinus (Simplicifusus) hyphalus M. Smith, 1940. – Kira (1962: 85); Springsteen and Leobrera (1986: 177+179, pl. 48, fig. 2). non M. Smith, 1940.

Simplicifusus hyphalus (M. Smith, 1940). – Higo, Callomon and Goto (1999: 263). non M. Smith, 1940.

Fusinus (Chryseofusus) hyphalus M. Smith, 1940. – Hadorn and Fraussen (2003: 218-219, figs. 22, 23). non M. Smith, 1940.

Type material: Holotype (78.1 x 24.7 mm, lv), NSMT-Mo 73704: 350-400 m, off Akune, Kagoshima Prefecture, Japan.

Paratype 1 (68.4 x 22.2 mm, lv), MC; paratype 2 (65.9 x 21.3 mm, lv), RH: 350-400 m, off Akune, Kagoshima Prefecture, Japan. Paratype 3 (72.9 x 24.4 mm, lv), MC; paratype 4 (75.9 x 25.1 mm, lv), MNHN; paratype 5 (73.5 x 25.1 mm, lv), ANSP 412950: 250 m, southwest of Cape Noma, Kagoshima Prefecture, Japan.

Other material examined: Japan, from type locality, 1 dd, MC. - Japan, off Cape Noma, Kagoshima Prefecture, 1 dd subad, MC. - Taiwan, deep water, 1 lv juv / 1 lv, RH. - Taiwan, Keelung, 1 lv / 1 dd subad, RH. - Unknown locality, 1 dd, RH.

Type locality: Off Akune, Kagoshima Prefecture, Japan.

Etymology: *F. (C.) satsumaensis* spec. nov. is named after the type locality. Satsuma is the ancient name of Western Kagoshima which is famous in the Japanese history with regard to the Meiji Restoration 1868.



Figures 1-8. *Fusinus* (*Chryseofusus*) *satsumaensis* spec. nov. 1, 2: holotipo NSMT-Mo 73704, Japan, off Akune, Kagoshima Prefecture, 78.1 mm; 3,4: paratipo MC, Japan, off Akune, Kagoshima Prefecture, 68.4 mm; 5, 6: paratipo RH, Japan, off Akune, Kagoshima Prefecture, 65.9 mm; 7: holotipo NSMT-Mo 73704, spire tip; 8: Operculum.

Figuras 1-8. Fusinus (*Chryseofusus*) *satsumaensis* spec. nov. 1, 2: holotipo NSMT-Mo 73704, Japón, frente a Akune, Kagoshima Prefecture, 78,1 mm; 3,4: paratipo MC, Japón, frente a Akune, Kagoshima Prefecture, 68,4 mm; 5, 6: paratipo RH, Japón, frente a Akune, Kagoshima Prefecture, 65,9 mm; 7: holotipo NSMT-Mo 73704, ápice de la espina; 8: opérculo.

Description: Shell rather large for subgenus (up to 80 mm), thin, light-weight but solid, fusiform with elongate spire, uniformly white, pale or light yellow, consisting of about 9 slightly convex whorls with weak subsutural concavity. Spire long and pointed, body whorl inflated and ventricose in adult specimens, siphonal canal narrow, occasionally curved. Aperture including intact siphonal canal slightly longer than spire. Suture fine but distinct, only weakly incised.

Protoconch relatively large, white, glossy, bulbous, consisting of $1\frac{1}{4}$ - $1\frac{1}{2}$ whorls, final $\frac{1}{4}$ whorl with 3 or 4 narrow axial riblets, reaching from suture to suture. Transition to teleoconch marked by a varix. Diameter 1.1-1.2 mm.

Axial sculpture inconspicuous, only visible on upper teleoconch whorls. Axial ribs weak, narrow, extending from suture to suture, interspaces narrow. 10 or 11 ribs on 3 uppermost teleoconch whorls, up to 15 on fourth whorl, becoming weaker, irregular and disappearing on fourth or fifth whorl. Axial growth lines fine but distinct on all whorls, crossing spiral sculpture and giving the surface the texture of linen.

Spiral sculpture weak. Teleoconch beginning with 5 close-set primary

spiral cords. Starting with third whorl, one finer secondary spiral cord appears between each pair of primary cords. From fourth whorl on, fine tertiary spiral threads appear at both sides of the secondary cords. Their number increasing to up to 5 on body whorl, while secondary cords become as strong as the primary ones.

Aperture large, ovate, pointed at both ends, white, smooth inside. Outer lip convex, thin, simple. Inner lip smooth, parietal callus thin, glossy, appressed to parietal wall, not detached, columellar folds absent.

Siphonal canal long, relatively narrow, usually curved, about as long as aperture. Outer side sculptured with fine, close-set spiral cords and intercalated fine threads of different strength.

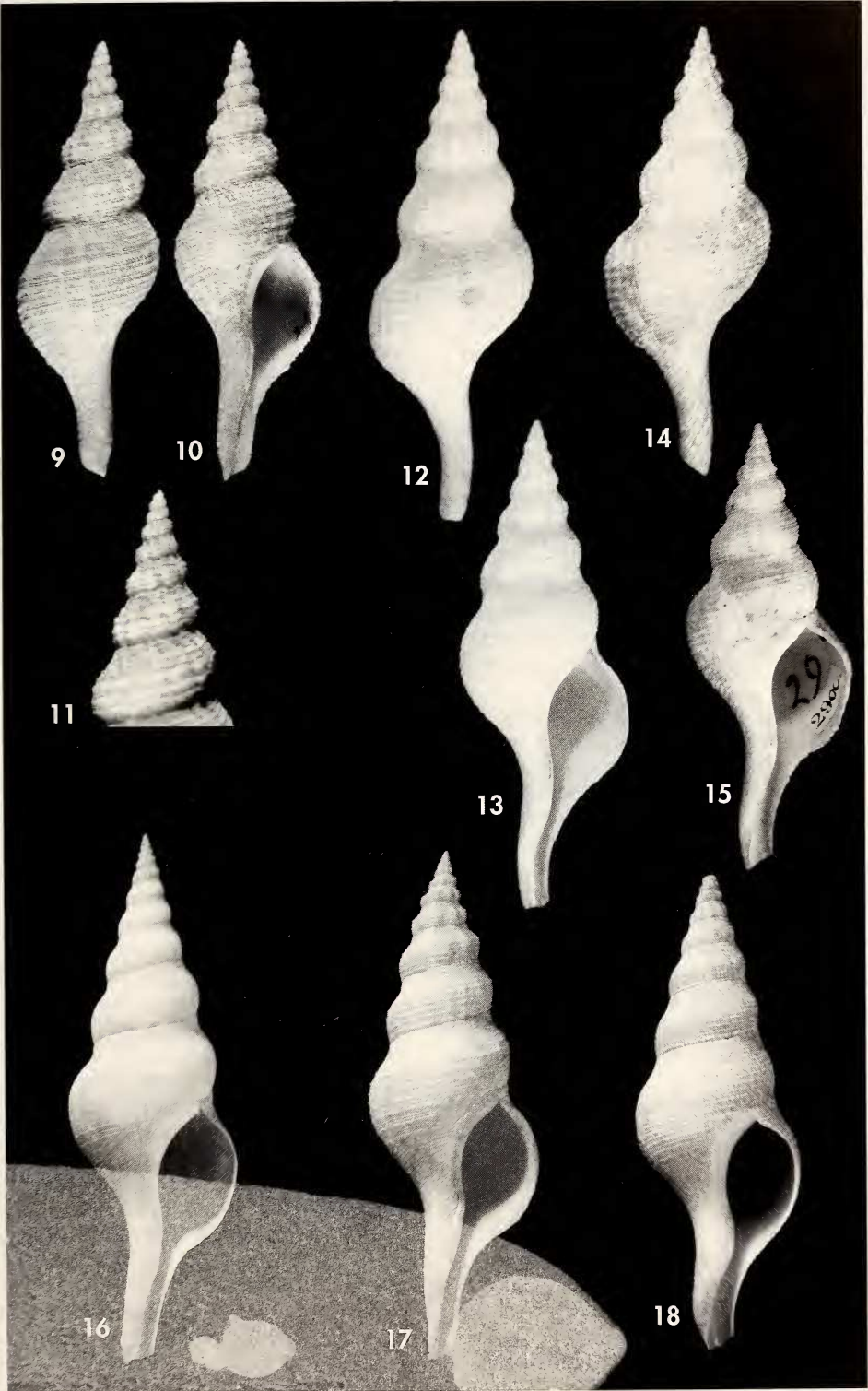
Periostracum thin, well-adherent, straw-brown.

Operculum (Fig. 8) typical of genus, corneous, red-brown, ovate, rounded above and pointed below, shape and size corresponding to aperture, outer side ornamented with concentric growth lines, with terminal nucleus.

Range and habitat: Japan, Enshu-nada and westwards, East China Sea at 100-300 m on sandy bottom (HIGO ET AL., 1999: 263); Taiwan (collection RH), Philippines, Cebu and Bohol (SPRINGSTEEN AND LEOBRERA, 1986: 177).

(Right page) Figures 9-11. *Fusinus (Chryseofusus) hyphalus* M. Smith, 1940, holotype FLMNH/UF 174301, Japan, Shikoku Island, Kochi Prefecture, off Tosa, 36.5 mm. 9, 10: shell; 11: spire tip. Figures 12, 13. *Fusus graciliformis* Sowerby, 1880, holotype BMNH 1880.10.15.2, Japan, 52.5 mm. Figures 14, 15. *Fusus sieboldi* Schepman, 1891, holotype RMNH 86858, Japan, 40.0 mm (=junior synonym of *F. graciliformis*). Figure 16. *Fusinus (Chryseofusus) westralis* Hadorn and Fraussen, 2003, holotype WAM S10876, northwest Australia, Rottneest Island, 114.4 mm. Figure 17. *Fusinus (Chryseofusus) jurgeni* Hadorn and Fraussen, 2002, holotype MNHN, southwest Madagascar, 94.2 mm. Figure 18. *Fusinus (Chryseofusus) chrysodomoides* (Schepman, 1911), lectotype ZMA, Indonesia, Molucca-Passage, 70.7 mm.

(Página derecha) Figuras 9-11. *Fusinus (Chryseofusus) hyphalus* M. Smith, 1940, holotipo FLMNH/UF 174301, Japón, isla Shikoku, Kochi Prefecture, frente a Tosa, 36,5 mm. 9, 10: concha; 11: ápice de la espira. Figuras 12, 13. *Fusus graciliformis* Sowerby, 1880, holotipo BMNH 1880.10.15.2, Japón, 52,5 mm. Figuras 14, 15. *Fusus sieboldi* Schepman, 1891, holotipo RMNH 86858, Japón, 40,0 mm (=sinónimo juvenil de *F. graciliformis*). Figura 16. *Fusinus (Chryseofusus) westralis* Hadorn y Fraussen, 2003, holotipo WAM S10876, NO de Australia, isla Rottneest, 114,4 mm. Figura 17. *Fusinus (Chryseofusus) jurgeni* Hadorn y Fraussen, 2002, holotipo MNHN, SO de Madagascar, 94,2 mm. Figura 18. *Fusinus (Chryseofusus) chrysodomoides* (Schepman, 1911), lectotipo ZMA, Indonesia, estrecho de las Molucas, 70,7 mm.



Comparison: *F. (C.) satsumaensis* spec. nov. was often misidentified as *F. hyphalus* M. Smith, 1940 by authors, including the paper of *Chryseofusus* by HADORN AND FRAUSSEN (2003). Shortly after publication of that paper the first author was able to locate the holotype of *F. hyphalus* [FLMNH/UF 174301: type locality: Japan, Shikoku Island, Kochi Prefecture, off Tosa, 100 fms, M. Smith's collection] (Figs. 9-11). *F. hyphalus* is a subjective junior synonym of *F. graciliformis* (Sowerby, 1880). This specimen is a dead collected juvenile specimen of 36.5 x 12.5 mm and is identical in shape, sculpture and protoconch structure but somewhat more slender than the holotype of *F. graciliformis* [BMNH 1880.10.15.2, 52.5 x 18.0 mm, dd, type locality: Japan] (Figs. 12, 13) and *F. sieboldi* (Schepman, 1891) [RMNH 86858, 40.0 x 15.2 mm, dd, type locality: Japan (= junior synonym of *F. graciliformis*)] (Figs. 14, 15). Most specimens referred to *F. hyphalus* by authors belong, as far as we are able to determine, to this new species.

The holotype of *F. hyphalus* (Figs. 9-11) differs from the new species by the smaller size, the more convex whorls, the more constricted suture, the reddish-brown coloured shell, and the smaller protoconch (diameter 0.8 mm instead of 1.1-1.2 mm). In general, *F. (C.) graciliformis* can be separated by the somewhat larger adult size, the deeper and more pronounced subsutural concavity, the less inflated and shorter body whorl, the clearly smaller and differently sculptured protoconch, and by often having rather strong, broad axial ribs on the upper whorls.

F. (C.) westralis Hadorn and Fraussen, 2003 (Fig. 16) differs by its larger shell (up to 140 mm), the longer spire, the larger number of whorls (11-13), the more pronounced subsutural concavity, the finer spiral sculpture consisting of a larger number of fine spiral cords and intercalated threads, and the shorter and broader siphonal canal.

F. (C.) jurgeni Hadorn and Fraussen, 2002 (Fig. 17) can be distinguished by

its larger shell (up to 100 mm), the longer spire, the more numerous (11 or 12) and more convex whorls, the more constricted suture, the wider spire angle, the stronger spiral sculpture, the often reddish-brown tinged spiral cords, the stronger and broader axial ribs on upper teleoconch whorls, the more rounded aperture and the broader siphonal canal.

F. (C.) chrysodomoides (Schepman, 1911) is similar in size, but differs by having a longer spire, a heavier shell, a larger number of whorls, a wider spire angle, a more pronounced axial sculpture on the upper whorls, a smaller and more rounded aperture, and a shorter and broader siphonal canal. The lectotype designated by HADORN AND FRAUSSEN (2003: 211) is figured here (Fig. 18).

F. satsumaensis is placed in the subgenus *Chryseofusus* based on the smooth adapical whorls, the weak, close-set, regular spiral sculpture crossed by distinct growth lines, giving the surface the texture of linen, the relatively short spire and siphonal canal, the less convex whorls with subsutural concavity, and the simple, thin, adherent parietal callus.

F. satsumaensis was, as misidentified as *F. hyphalus*, often placed in the genus *Simplicifusus* Kuroda and Habe in Kuroda, Habe and Oyama, 1971 [type species: *Simplicifusus noguchii* Habe and Masuda, 1990]. *Simplicifusus* was concluded to be a subjective junior synonym of *Granulifusus* by SNYDER (2003: 87-88). *Granulifusus* has an operculum which is completely different from all other species belonging to the subgenus *Chryseofusus* and all other subgenera in *Fusinus*. Species of the genus *Fusinus* have an operculum with terminal nucleus, corresponding to the aperture in size and shape. *Granulifusus* has a small, round-ovate, thin operculum, not filling the aperture, with nucleus situated at lower outer side. For a detailed discussion we refer to HADORN AND FRAUSSEN (2003: 211) and to SNYDER (2003: 88).

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